Ad Hoc Combined Sewer System Plan Stakeholder Group
(CSS Stakeholder Group)
1101 Sister Cities, 301 King Street City Hall
Alexandria, VA 22314
Monday, November 2, 2015
7:00 PM – 9:00 PM
<u>**Agenda**</u>

1) Welcome and Call to Order   7:00 – 7:10
   a) Acceptance of Meeting #1 Summary
   b) Meeting Format

2) Technical Presentation   7:10 – 8:10
   a) Combined Sewer Overflow Control Strategies Ranking and Shortlist
   b) Collaborative Decision Making Process
   c) Green Infrastructure Overview and Strategy Discussion

3) Stakeholder Group Discussion   8:10 – 8:40

4) Public Comment   8:40 – 8:55

5) Wrap up and Adjournment   8:55 – 9:00
   a) Next Meeting January 7, 2015 7pm-9pm Sister Cities Conference Room 1101

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b) Group Consensus Process and Questions for Today	
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<u>**Discussion Questions**</u>

- **Given that the community and City Council generally support GI, should a GI strategy be developed specific to the Combined Sewer System? Or should the City continue to approach GI as a broader, Citywide program? Consider the needs and interests of those you represent.**

- **What level of GI should the City plan for their Long Term Control Plan Update? Discuss the challenges and benefits.**

City of Alexandria, Virginia

Long-Term Control Plan Update

**CSS Stakeholder Group
Meeting #2
November 2, 2015**

Department of Transportation and Environmental Services

ECO-CITY ALEXANDRIA

City of Alexandria, Virginia

PRESENTATION OUTLINE

❑ Combined Sewer Overflow Control Strategies: Ranking and Shortlist

❑ Group Consensus Process and Questions for Today

❑ Green Infrastructure Overview and Strategy

City of Alexandria, Virginia

Combined Sewer Overflow Control Strategies: Ranking and Shortlist

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Long Term Control Plan Update Overall Strategy

- **Other Potential Opportunities**
- **Targeted Sewer Separation** — Complementary Strategy
- **Green Infrastructure** — Complementary Strategy
- **Store and Treat** — Primary Strategy

Combined Sewer Strategies Evaluated

* **Store and treat:** build CSO storage and send to wastewater treatment facility after CSO event for high level of treatment
  - Storage tanks (aboveground or underground)
  - Deep tunnels
* **Sewer separation:** build new sewers to separate all storm and sanitary sewers in Old Town
* **Green infrastructure:** Reduce stormwater runoff
* **Disinfection:** kill the bacteria in the overflow
* **Combination** of the above strategies

Combined Sewer Control Strategy Rankings

Rank	CSO Control Strategy
1	**Separate Storage Tunnels**
2	**Storage Tunnel for Hooffs Run and Storage Tank at Royal Street**
3	**One Storage Tunnel**
4	Separate Storage Tanks
5	Storage Tunnel for Hooffs Run and Disinfection at Royal Street
6	One Storage Tunnel (relocate outfalls to the Potomac)
7	Separate Disinfection Facilities
8	Green Infrastructure
9	Complete Sewer Separation

9. Complete Sewer Separation

Recommended as Integrated Complementary Strategy
Not Recommended as Primary Strategy

* 19 acres under construction continuously for 17 years
  - Unrealistic before 2035
* No reduction in number of overflows until full separation is completed
* Additional area added to the stormwater (MS4) permit
  - No nutrient credit
* Potential impact of historical character
* **Most disruptive**
* **Cost: $300 - $450 M**
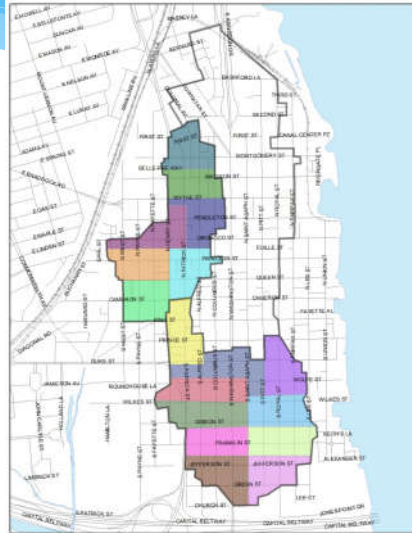
8. Green Infrastructure

Recommended as Integrated Complementary Strategy
Not Recommended as Primary Strategy

* Reduces stormwater volume, but does not address bacteria load directly

* How evaluated:
  - Assumed implementation on **ALL** City-owned parcels and City right-of-way

* Results:
  - 20-30% reduction in combined sewer overflow volume
  - **Will not achieve regulatory compliance**
  - Full implementation of green infrastructure unrealistic by 2035

* Cost: $140 - $210 M
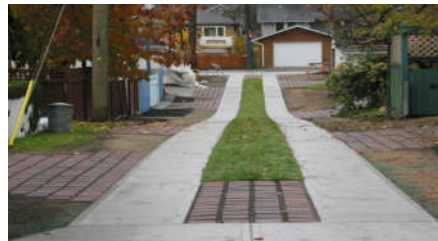
7. Separate Disinfection Facilities
Not Recommended

* **Safety concerns related to transportation and storage of chemicals in residential and urban settings**
* No reduction in combined sewer volume
* Only kills bacteria, other pollutants remain
* Cost: $65 - $100 M

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6. One Storage Tunnel
(Substantially reduce overflows and relocate to the Potomac River)
Not Recommended

* Stores and treats CSO to substantially reduce overflows
* Remaining overflows outfall to the Potomac River
  - **Additional regulatory and permitting challenges**
  - Other store and treat strategies considered do not require relocation to the Potomac
* Most costly store and treat option
* Most complex hydraulics
* Cost: $130 - $195 M

5. Storage Tunnel for Hooffs Run and Disinfection at Royal Street
Not Recommended

* **Safety concerns related to transportation and storage of chemicals near Royal Street outfall**
* No reduction in combined sewer volume at Royal Street
* Only kills bacteria, other pollutants remain from Royal Street outfall
* Cost: $85 - $130 M

4. Separate Storage Tanks
Not Recommended

* **Does not address additional wet weather issues that control strategies #1-3 address**
* **Siting Challenges**
  – Future challenges related to access and maintenance
  – Tank off of Duke Street
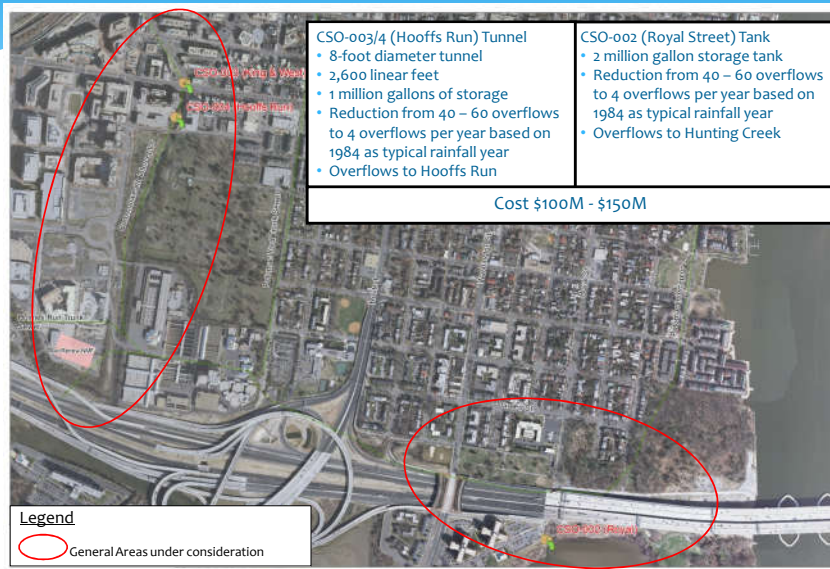 – Constructability challenges
  – Road closures
* Cost: $90 - $135 M

3. One Storage Tunnel
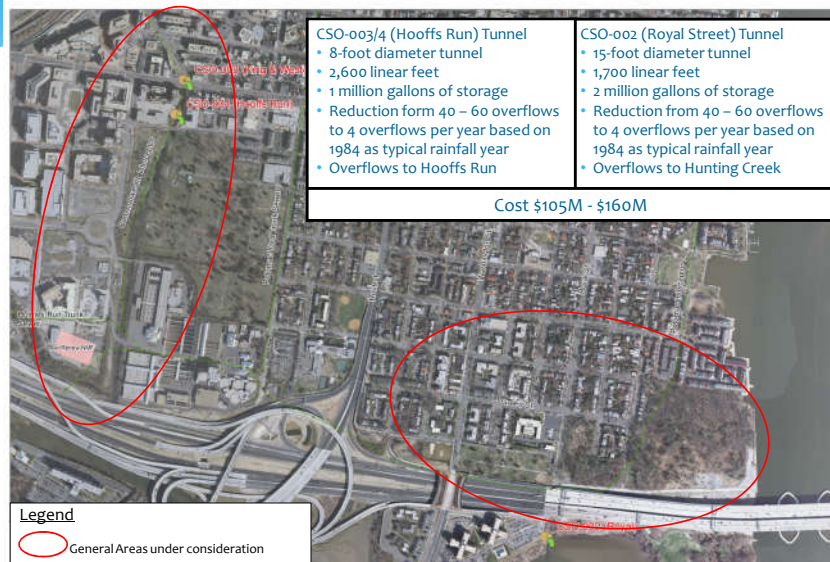## Recommended for Further Evaluation

CSO-002/3/4 Tunnel
• 8-foot diameter tunnel
• 7,400 linear feet
• 3 million gallons of storage
• Reduction from 40 – 60 overflows 4 overflows per year based on 1984 as typical rainfall year
• Overflows to Hunting Creek and/or Hooffs Run
• Cost: $120 - $180 M

Legend

⬭ General Areas under consideration

2. Storage Tunnel for Hooffs Run and Storage Tank at Royal Street
Recommended for Further Evaluation

CSO-003/4 (Hooffs Run) Tunnel
• 8-foot diameter tunnel
• 2,600 linear feet
• 1 million gallons of storage
• Reduction from 40 – 60 overflows to 4 overflows per year based on 1984 as typical rainfall year
• Overflows to Hooffs Run

CSO-002 (Royal Street) Tank
• 2 million gallon storage tank
• Reduction from 40 – 60 overflows to 4 overflows per year based on 1984 as typical rainfall year
• Overflows to Hunting Creek

Cost $100M - $150M

Legend

⬭ General Areas under consideration

1. Separate Storage Tunnels
Recommended for Further Evaluation

CSO-003/4 (Hooffs Run) Tunnel	CSO-002 (Royal Street) Tunnel
• 8-foot diameter tunnel	• 15-foot diameter tunnel
• 2,600 linear feet	• 1,700 linear feet
• 1 million gallons of storage	• 2 million gallons of storage
• Reduction form 40 – 60 overflows to 4 overflows per year based on 1984 as typical rainfall year	• Reduction from 40 – 60 overflows to 4 overflows per year based on 1984 as typical rainfall year
• Overflows to Hooffs Run	• Overflows to Hunting Creek
Cost $105M - $160M	

Legend

⬭ General Areas under consideration

Store and Treat Strategy

Advantages:
- ∗ Captures and stores the combined sewer overflow and then sends it to the wastewater treatment plant for a high level of treatment
- ∗ Minimal aesthetic impact and spatial requirements, as the facilities are largely underground
- ∗ Generates credits for stormwater

Disadvantages:
- ∗ Tunnels – construction impacts at the shafts
- ∗ Storage tanks – can be difficult to site due to lack of available space
- ∗ Easement acquisition required

Group Consensus Process Questions for Today

City of Alexandria, Virginia

Building Consensus

* **Step 1 – Present the Issue**
* **Step 2 – Clarify Questions**
* **Step 3 – Engage in Discussion**
* **Step 4 – Respond**

Green Infrastructure (GI) Strategy: Key Questions to be Answered

Initial Questions:

* Given that the community and City Council generally support GI, should a GI strategy be developed specific to the Combined Sewer System? Or should the City continue to approach GI as a broader, Citywide program? Consider the needs and interests of those you represent.
* What level of GI should the City plan for in their Long Term Control Plan Update? Discuss the challenges and benefits.

Next Steps:

* GI will continue to be a focus of future meetings

City of Alexandria, Virginia

Green Infrastructure Overview

City's Environmental Stewardship

* Continue Alexandria's longstanding leadership role as a good environmental steward and enhances the quality of life for City stakeholders
  * Eco-City Charter: Improves Water Quality (2008)
    …eliminating combined sewer overflows, reducing storm water runoff, and improving the quality of our streams so that they are once again fishable and swimmable.
  * Environmental Action Plan (2009)
    * *Continue identifying sewer separation opportunities through the Area Reduction Plan*
    * *Eliminate the harmful impact of the combined sewer systems in the long-term, and minimize them in the short term*
* Ensures the City remains in compliance with all federal/state laws and regulations for water quality

Stormwater Regulatory Drivers

* <u>Chesapeake Bay Total Maximum Daily Load (TMDL)</u> mandates reductions in nitrogen, phosphorus and sediment
  – Reductions from separate stormwater area
  – No reductions from combined sewer area
* Enforced through <u>M</u>unicipal <u>S</u>eparate <u>S</u>torm <u>S</u>ewer <u>S</u>ystem (MS4) permit
  – 192 miles of storm sewer
  – 439 stormwater outfalls
* MS4 Permit has 5-year general permit cycles
  – MS4 Permit effective July 1, 2013

City Stormwater Phased Reductions

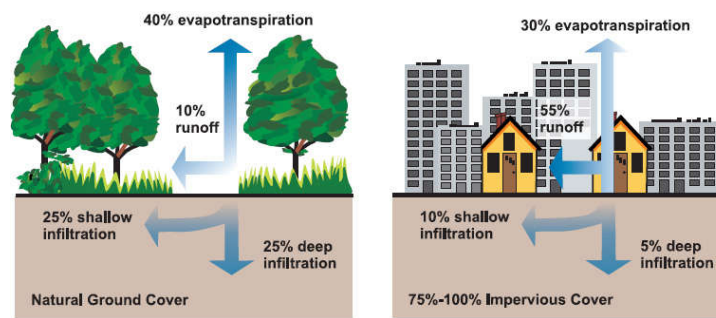Three 5-year MS4 (stormwater) permits to meet Chesapeake Bay reductions:

Reduction	Permit Cycle	Approx. Equivalent (ac)*
5%	2013 – 2018	120 – 330
35%	2018 – 2023	660
60%	2023 – 2028	1,440
100%	By 2028	2,220 – 2,400

*actual acres treated depending on type of infrastructure installed

TOTAL COST = ~$100 million

What is Green Infrastructure?

* Stormwater management strategy that uses natural features to manage water and provide environmental and community benefits

40% evapotranspiration
10% runoff
25% shallow infiltration
25% deep infiltration
Natural Ground Cover

30% evapotranspiration
55% runoff
10% shallow infiltration
5% deep infiltration
75%-100% Impervious Cover

Source: EPA

What is Green Infrastructure?

Bioswales

Rain Gardens

Planter Boxes

Permeable Pavement

Rainwater Harvesting

Downspout Disconnects

Green Infrastructure Benefits

* Mimics natural systems
  - Reduces runoff volume, peak flows, and pollutants
  - Improves water quality and reduced nutrient loads discharged to the Chesapeake Bay
* Community benefits:
  - Green spaces
  - Improved aesthetics
  - Increases property values
  - Reduces heat island effect
* Environmental education

Green Infrastructure Challenges

* Space and location
  - Pedestrian facilities (ADA curb amps, sidewalk widths)
  - Historic preservation
* Soils (infiltration rates)
  - Primarily silt and marine clay
* Proximity to other utilities
* Construction impacts
* Proper maintenance and access

Green Infrastructure Policies

* Existing regulations and policies:
  - Environmental Management Ordinance
    - *Stormwater management required in combined area even though not mandated*
  - Green Building Policy
  - Green Sidewalk Guidelines
  - Holistic approach in development of new Small Area Plans

Green Sidewalks
BMP Design Guidelines

EcoCity ALEXANDRIA
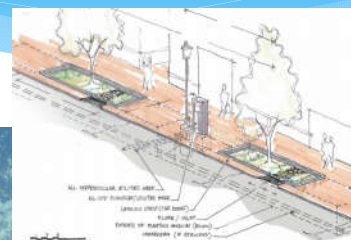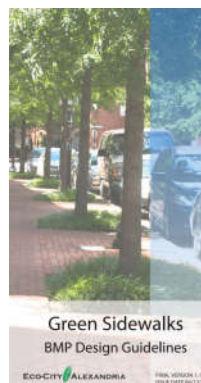
City Green Infrastructure Projects

* Green Roofs
  - City Hall
  - Charles Houston Rec Center
  - Cora Kelly Elementary
  - Duncan Library
  - Fire Station 202
  - Polk Elementary
  - T.C. Williams
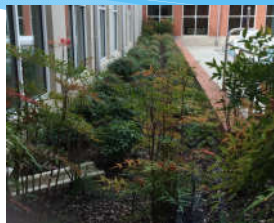

City Hall Green Roof

Charles Houston Rec Center

Duncan Library Green Roof

City Green Infrastructure Projects

* Stormwater Bioretention
  - Beatley Library
  - Charles Barrett
  - Cora Kelly
  - Jefferson Houston
  - Miracle Field
  - Pocket Park
  - Police Facility
* Cistern/Rainwater Reuse
  - Fire Station 206
  - Jefferson Houston
  - Police Facility
  - T.C. Williams
* Trees, planter boxes and vegetation in the City right-of-way

Charles Houston Rec Center

Beatley Library

West Glebe Road
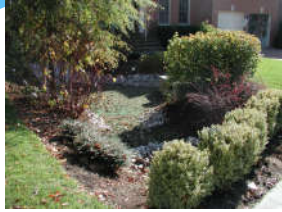
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Planned City Green Infrastructure

* Windmill Hill Park
  - Living shoreline
* Stream Restoration Projects
  - Strawberry Run
  - Holmes Run
* Pond Retrofits
  - Lake Cook
  - Ben Brenman
  - Both pond retrofit projects include state funds (SLAF – Stormwater Local Assistance Funds)

Stream Restoration

Privately-Owned Green Infrastructure Examples
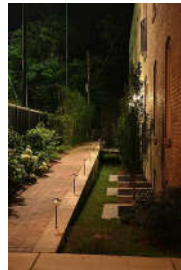
Kings Cloister Bioretention

Cromley Lofts

Stonegate Boardwalk

Kensington Court Bioretention

The Henry Green Roof

Privately-Owned Green Infrastructure Examples

950 N Washington St
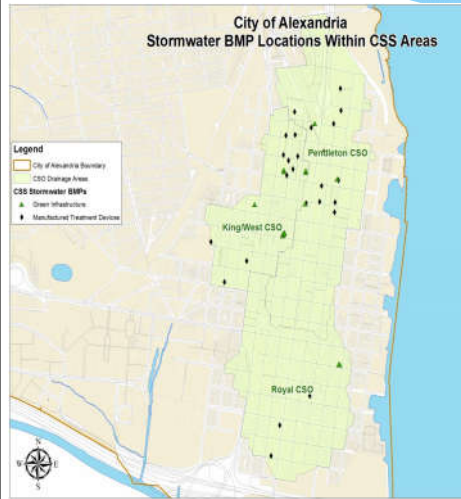
Old Presbyterian Meeting House

Princess Street

Kingsley Apartments

N Royal Street

Green Infrastructure Citywide

City of Alexandria
Stormwater BMP Locations Within CSS Areas

Legend
- City of Alexandria Boundary
- CSO Drainage Areas
- CSS Stormwater BMPs
- Green Infrastructure
- Manufactured Treatment Devices

Pentleton CSO
King/West CSO
Royal CSO

	Citywide		Combined Sewer Area	
	All BMPs	GI	All BMPs	GI
Acres treated	1,663	81	40	1.3
# BMPs	680	190	50	16

CSO GI Demonstration Project

* Permit requirement to study green infrastructure and implement demonstration project(s)
* Goals:
  – Identify opportunities for Green Infrastructure in Old Town
  – Evaluate effectives of Green Infrastructure
  – Determine costs and challenges
* Project Status:
  – 29 sites identified and ranked
  – 3 sites selected for further consideration
  – Field testing and concept plans being developed now for all three
  – Next steps: Select 1 project for design and construction
  – Available budget: $1.5 million for up to 3 projects

Combined Sewer Systems GI Benchmarking

Location	Green Investment	
	Proposed Cost ($)	% of Total Investment
DC Water	$100-$200 million	4%-8% $2.6 billion
Richmond, VA	$0*	0%* $850 million
Lynchburg, VA	$0*	0%* $340 million
Kansas City (WSD)	$3.7 million	1%-2% $2.3 billion
Cleveland (NEORSD)	$42 million	1%-2% $3 billion
Louisville (MSD)	$47 million	17% $377 million
New York (DEP)	$1.5 billion	22% $6.8 billion
Philadelphia (PWD)	$1 billion	63% $1.6 billion

* GI was evaluated but not included as a commitment in the long term control plan to meet the CSO control goals; however, GI may be considered where appropriate and applicable to provide additional benefits.

City of Alexandria, Virginia

Green Infrastructure Strategy Discussion

Green Infrastructure (GI) Strategy: Key Questions to be Answered

Initial Questions:

* Given that the community and City Council generally support GI, should a GI strategy be developed specific to the Combined Sewer System? Or should the City continue to approach GI as a broader, Citywide program? Consider the needs and interests of those you represent.

* What level of GI should the City plan for in their Long Term Control Plan Update? Discuss the challenges and benefits.

Next Steps:

* GI will be a focus of the January Stakeholder Meeting

Collaborative Decisionmaking Process
Based on Bressen, 2007

Step 1 – Present the Issue
- Questions for Today
- Why it matters
- Goal of today's discussion

↓

Step 2 – Clarify Questions
- Ensure issue is fully understood
- Gather thoughts/feelings, ideas, possibilities
- Consider individual needs
- What we will do and how

↓

Step 3 – Engage in Discussion
- Does this proposal work for the group?
  - Have all concerns been resolved?

Modification is Needed
Address concerns
Changes to better serve the whole

Concerns
Problems with the proposal
May hold for discussion at future meeting

↓

Step 4 - Respond
Group members can respond to the question with **one of three responses:**

Agreement
I can live with it
It's alright
I agree wholeheartedly

Stand Aside
I don't like this proposal because [reason], but I am willing to let the group proceed.

Disagreement
I have a firm conviction that this proposal is against the values of this group.

If there is Agreement
Sense of unity among participants
No remaining unresolved concerns

If there is not consensus
Staff will document and respond

Meeting Attendees	
CSS Stakeholder Group	*City of Alexandria*
Skip Maginniss	Bill Skrabak
Rich Brune	Lalit Sharma
Lee Hernly	Erin Bevis-Carver
Stacy Langsdale	
Kate Mackenzie	*Greeley and Hansen LLC (engineering consultant)*
Elizabeth McCall	John McGettigan
Stephen Milone	John Cassidy
Randy Randol	Dustin Dvorak
Brett Rice	
Dixie Sommers	*Waterford Inc. (public engagement consultant)*
Jack Sullivan	Beth Offenbacker
Tom Walker	Paul Coelus
Chuck Weber	

The meeting convened at 7:00 pm with welcome comments by City staff members, Bill Skrabak and Lalit Sharma.

The CSS Stakeholder Group members, City staff members and project consultants, and the public introduced themselves. City staff then gave a presentation following the established agenda:

- Mr. Skrabak explained what a combined sewer system (CSS) is and how it works. He then went on to explain the City's current Long Term Control Plan, what a Total Maximum Daily Load (TMDL) is and how the one for Hunting Creek applies to the City's CSS.
- Mr. Skrabak and Mr. Sharma detailed the types of combined sewer control strategies that have been evaluated to meet the goals of the TMDL and explained how the current shortlist of three store and treat strategies was evaluated.
- Mr. Skrabak explained that City staff will develop a memorandum documenting the consensus of the group as it relates to the charge of the CSS Stakeholder Group as follows:
  - Recommendations for minimizing impacts to the community for the primary project strategy chosen by the City.
  - A summary of the Group's efforts to review and monitor the preparation of the Long Term Control Plan Update, including a list of significant issues, if any.
  - A summary of the Group's efforts to disseminate information to the public about the Long Term Control Plan Update.
  - A summary of the public input received by the Group during development of the Long Term Control Plan Update.

The meeting adjourned at 9:15 pm.

The following is a summary of the types of questions asked by members of the CSS Stakeholder Group or members of the public and the answers provided by City staff and consultants. This summary discusses the general concepts and not the individual questions verbatim.

eco-City Alexandria

How does the Hunting Creek TMDL apply to the combined sewer system?

The Hunting Creek TMDL, issued by the Virginia Department of Environmental Quality, provides a "budget" for the *E. coli* bacteria that can be discharged and still meet the water quality standards issued by the Environmental Protection Agency of "swimmable and fishable". The "budget" contains many sources of *E. coli* including combined sewer overflows (CSOs), stormwater, wildlife, the treated effluent from Alexandria Renew Enterprises wastewater treatment facility, as well as others. The Hunting Creek TMDL requirements necessitate that the *E. coli* bacteria from the City's CSO-002 outfall (at the base of Royal Street) must be reduced by 80% and that the CSO-003 and CSO-004 outfalls (just south of Duke Street in Hooffs Run) must be reduced by 99%, all based on rainfall data from the years 2004 and 2005.

It is important to note that the City's CSO-001 site (located at the intersection of Pendleton Street and Union Street) discharges into Oronoco Bay and out into the Potomac River. Oronoco Bay is not included in the Hunting Creek TMDL and therefore, there are currently no regulatory requirements for the City to address CSO-001. However, the City is evaluating strategies that could be implemented at CSO-001 to reduce the discharges into Oronoco Bay and to help improve water quality and will be sharing this information with the CSS Stakeholder Group.

How will the City's plan incorporate future regulatory stormwater requirements in other parts of the City?

The City has a separate stormwater permit that requires reductions of pollutants in the City's stormwater discharges between now and Year 2028. The City is actively working to meeting these reductions. In addition to the work done on the stormwater side, the Long Term Control Plan Update can also help to achieve the required stormwater pollutant reductions.

The shortlisted strategies are all store and treat strategies; this means they will store the combined sewer overflows (which are predominantly comprised of stormwater) until the wet weather event has passed and then pump them back to Alexandria Renew Enterprises (AlexRenew) for a high level of treatment. Since AlexRenew provides such a high level of treatment, this means that excess nitrogen, phosphorous, and suspended solids credits could be generated. The City is confident that by working with the Virginia Department of Environmental Quality, these credits can be applied to stormwater discharges elsewhere in the City.

What are the current cost estimates and what is the timeline for construction?

The shortlist of alternatives contains combinations of deep storage tunnels and underground storage tanks. Based on the preliminary estimates developed thus far, the costs could range from $100 million to $200 million. These are preliminary cost estimates so the level of accuracy is assumed to be within -30% to +50%. Based on the City's current CSS Permit, once the Long Term Control Plan Update is approved by the Virginia Department of Environmental Quality infrastructure to store and treat combined sewer flows must be

constructed no later than 2035. However, the City anticipates starting major capital projects in the next few years in addition to their ongoing efforts.

Will the CSS Stakeholder Group evaluate other strategies/controls other than the top three shortlisted strategies?

The CSS Stakeholder Group will not evaluate other strategies/controls, the charge of the group is to provide input and recommendations on the three shortlisted strategies only. At the request of the Group, City staff can present in detail how the shortlisted strategies were determined. It should be noted that although green infrastructure is one of the shortlisted strategies since it does not meet the goals of the Hunting Creek TMDL, it will be considered as a complementary strategy and input from the Group will help to finalize its level of implementation.

There were two items that were deferred and will be addressed at the next meeting:
1. Scheduling a potential field visit for the group to see the outfalls as well as the AlexRenew treatment plant; and
2. Setting a regular meeting date and time for future CSS Stakeholder Group meetings.

The next CSS Stakeholder Group meeting will be **Monday, November 2, 2015 from 7-9pm** in the Sister Cities Conference Room 1101.